

Attachment A

Flagstaff Watershed Protection Project

Pilot Project Statement of Work

June 6, 2013

Background

Projections show that there could be extensive, severe flooding throughout Flagstaff if a high-intensity fire were to occur on the slopes of the Dry Lake Hills, and that the Lake Mary Reservoir, which provides roughly 50 percent of the City of Flagstaff's drinking water, could become non-functional due to sediment and carbon influx following a severe wildfire. The City of Flagstaff (the City) is helping to provide resources to reduce these risks through a \$10 million bond approved by voters in November 2012 with 73 percent voter approval. These funds, in conjunction with additional funding by the Forest Service, will allow the Forest Service and the City to jointly analyze and treat areas that otherwise would not be treated due to prohibitive costs associated with very steep terrain, low value material, and other challenging issues such as wildlife and visual concerns.

This effort is known as the Flagstaff Watershed Protection Project, and includes a patchwork of completed NEPA, ongoing Four Forests Restoration Initiative (4FRI) NEPA, and planned new NEPA--all of which are being consolidated under one implementation plan for a total of approximately 15,000 acres. The project area is primarily focused within the Dry Lake Hills portion of the Rio De Flag 6th Code Watershed, and includes a portion of Mormon Mountain that drains into the Upper Lake Mary Watershed. About 1,872 acres within the general project boundary are already covered under previous NEPA decisions: Jack Smith Schultz (2009) and Eastside (2007) Fuels Reduction and Forest Health Restoration Projects.

As part of this effort, the Forest Service and the City will implement a "pilot project" on two areas within the Dry Lake Hills that were analyzed for mechanical treatment and prescribed burning in the Jack Smith Schultz NEPA process. The two areas, North and South, are roughly nine and eight acres respectfully, and are located on rocky, 40 percent slopes similar to other adjacent areas of the project. The North unit is mostly ponderosa pine with a small component of mixed conifer. The South unit contains more mixed conifer and dog-hair thickets.

The City of Flagstaff is a cooperating agency with the Forest Service through a Memorandum of Understanding (MOU), which delineates the expectations and roles for both agencies. There is also a master participating agreement for the funding aspect of this project to allow bond monies to go toward both the planning and implementation of the project. Supplemental Project Agreements (SPAs) will be signed for each activity involving a transfer of money or expenditure of money for activities on the National Forest, including the funding of this pilot project through a contract procured and administered by the City.

Scope

For this activity, the City shall provide sole funding for a contract to implement the activities outlined under "Tasks" and in Appendix A (Proposal and Prescriptions for Treating Two Demonstration Units). The City shall procure and administer a contract with an operator who has the equipment necessary to cut commercial-sized trees as well as small-diameter trees (see Equipment Specifications below), and either pile or windrow the cut material to the specifications listed in the desired conditions section of Appendix A and as overseen by City's Project Manager or designated representative). The Forest Service shall identify a Project Manager and Liaison(s) to work with the City's Project Manager during implementation of the project. A designated Forest Service representative will be present during all project activities. The City shall provide all required documentation for the procurement and administration of the contract, including inspections. The Forest Service shall provide job hazard analyses (JHAs) for worksite visitors including other Forest Service employees and media personnel.

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The City shall notify the Forest Service's designated contact when implementation activities are scheduled to occur at least two weeks prior to implementation in order to provide sufficient time for interested parties to be present.

Because the Flagstaff District Silviculturist will be on site during implementation, marking the prescription may not be necessary. If it is determined that marking the trees is necessary, Forest Service shall perform the layout and marking of the units according to the attached prescription (Appendix A) prior to implementation using a "cut tree" mark of blue paint. Boundaries shall be marked in orange paint by the Forest Service. Archaeological site boundaries are marked with white paint for avoidance.

Objectives

The objective for this project is to test the effectiveness and feasibility of two types of treatment activities on steep, rocky slopes within the two demo areas identified in order to ascertain the suitability of proposing such treatments across the rest of the project area. Upon completion, the City and the Forest Service shall evaluate the results and determine if these treatments met the desired conditions outlined in Appendix A.

Place of Performance

The contracted activities will take place on the National Forest in the two units identified within the Flagstaff Watershed Protection Project area (authorized under the Jack Smith Schultz NEPA decision), referred to as the North and South units. See map below.

Period of Performance

Harvesting and piling activities will occur when the designated City and Forest Service representatives are on site only, and are anticipated to take no more than three work days per site for a total of six days, not including equipment transportation to and from the site. Implementation of the contract shall be completed no later than August 31, 2013.

Equipment Specifications

The City shall ensure the contractor has the equipment necessary to operate on steep slopes (around 40 percent), including a self-leveling, tracked feller buncher

Tasks

The City's COR shall ensure that the contractor follows the cutting prescription described in Appendix A, including leaving all Yellow Pines, trees greater than 24" dbh and all trees within identified archaeological sites. Cut trees will be piled or windrowed within the units by the contractor to the specifications described below and in Appendix A.

Slash Treatment:

- Piles and windrows will be placed in-between groups of trees
- Do not place piles and windrows beneath the crowns of any leave trees
- Avoid placing piles and windrows on large old logs or stumps

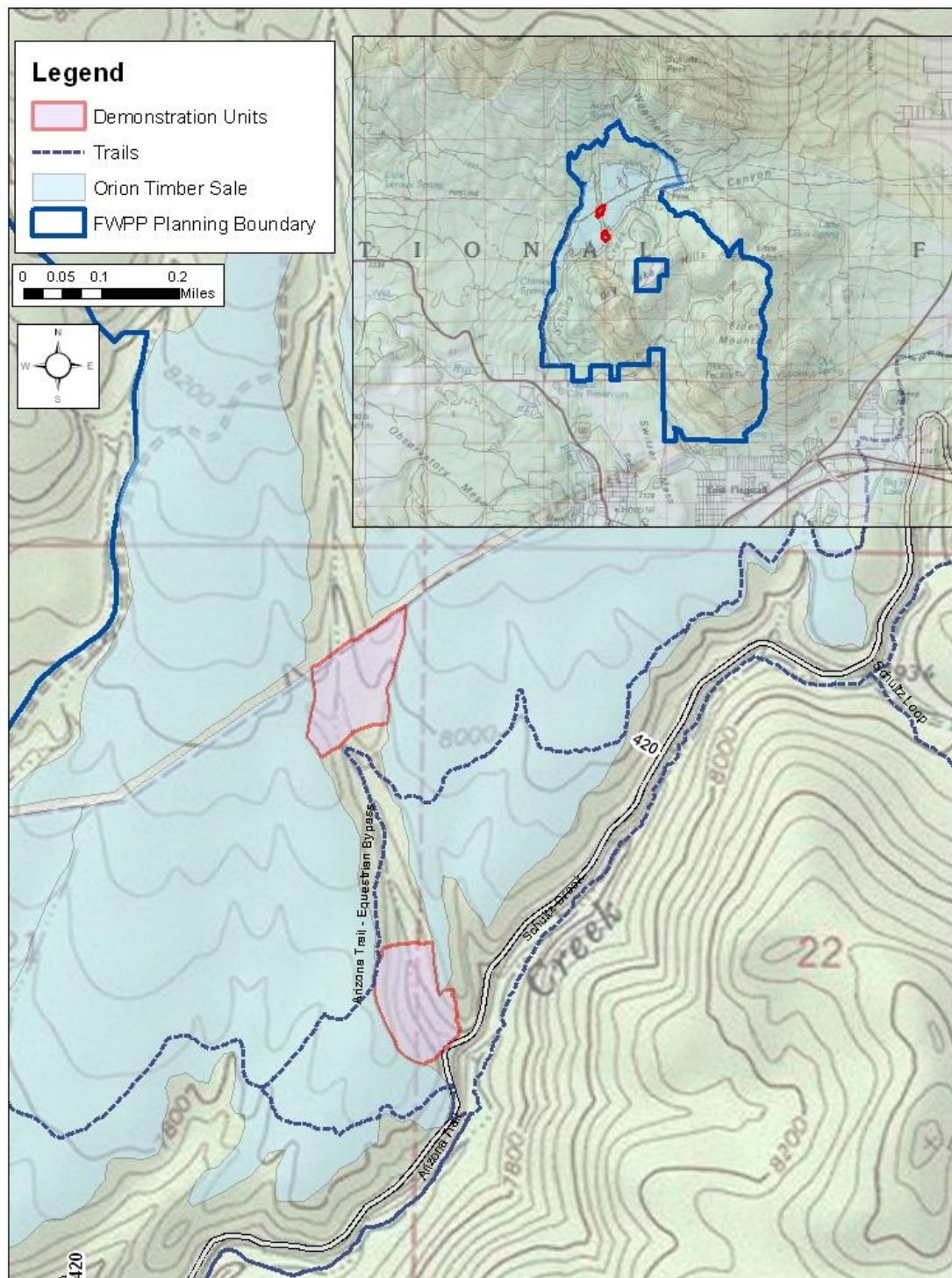
The Forest Service District Fuels Specialist shall work with the COR to ensure material is piled to desired specifications, which may mean that activities are modified periodically. Not all acres may be cut as a part of this project; the tasks will be deemed complete once the objectives are determined to have been met by the City and the Forest Service within the six day period described above.

The slash piles generated during treatment shall be disposed of by the Forest Service, either by burning or biomass utilization, if available at the time of disposal. For the prescribed burning method, burning would occur

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when the material has dried sufficiently for consumption and conditions are suitable for prescribed burning as determined by the District Fuels Specialist. Prior to burning, the Supplemental Project Agreement for the Pilot Project will be modified to account for the value of the activity, including personnel and equipment time.

Figure 1



Appendix A: Proposal and Prescriptions for treating two Demonstration Units for the Flagstaff Watershed Protection Project

The Flagstaff Ranger District of the Coconino National Forest is proposing to treat two demonstration units within the Jack-Smith Schultz Environmental Analysis Area (Figure 1). These treatments are designed in conjunction with Flagstaff Watershed Protection Project to demonstrate what potential treatments in the Flagstaff Watershed Protection Project (FWPP) may look like and to determine potential effects to other resources, including soils. These treatments will help to inform treatment options and intensities that may be needed for the FWPP project.

What the district is proposing to do is treat two areas that contain steep slopes and mixed species. Instead of removing the trees and slash, the trees and slash will be piled and burned within the stand. There are two major reasons for proposing these demonstration units. One, because the local Forest Service workforce is mainly experienced with conventional logging on flat ground, this would be a great opportunity for the district staff and local contractors to experience harvesting on steep slopes and understanding the process. Much of the proposed treatments within the FWPP include treating on steep slopes. This would give the FWPP planning and analysis team a chance to observe and evaluate effects on a small scale, and whether the effects would be desirable in other areas currently under analysis. Second, through the planning process, several areas within the FWPP project area present logistical challenges to conventional treatment, where building a road maybe cost prohibitive or ecologically undesirable, so instead of harvesting and removing the trees, it may be possible to harvest and burn the trees with in the unit.

The treatments are also being undertaken as a learning experience and educational effort. Some of the objectives that we hope to achieve are:

- To have an area to show people possible treatments and to foster discussion and feedback for FWPP proposed actions.
- Understanding the capability of locally available harvest equipment on steep slopes
- Learning if treating and burning of slash within a unit a viable option
- What are the size of piles and distances from residual trees need to prevent excessive scorch
- Understanding the challenges of marking on steep slopes and in mixed species stands
- Learning the process of moving/utilizing City funds for contracted activities on the National Forest

The pictures below (figures 2-8) will give you a good sense of the stand conditions. The southern demo units is mostly mixed conifer and is uneven-age old growth (fig 2-4). However there is a very dense understory of trees creating a fuel ladder which greatly increases the fire hazard in that unit. The northern demo unit is mostly ponderosa pine and is primarily even-aged (fig 6-8). While there may not be a much of a fuel ladder the tree canopy is much more closed in and presents a high fire hazard for a running crown fire.

Treatments will be designed to reduce the fuel ladders and open up the canopy by creating groups of trees with openings in-between the groups of trees. No old growth trees will be cut and all other old growth components will be retained as much as possible.

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Southern Unit



Figure 2: There is a dense understory of mixed conifer species and a continuous ladder fuels.



Figure 3: Some areas are occupied with large boulders

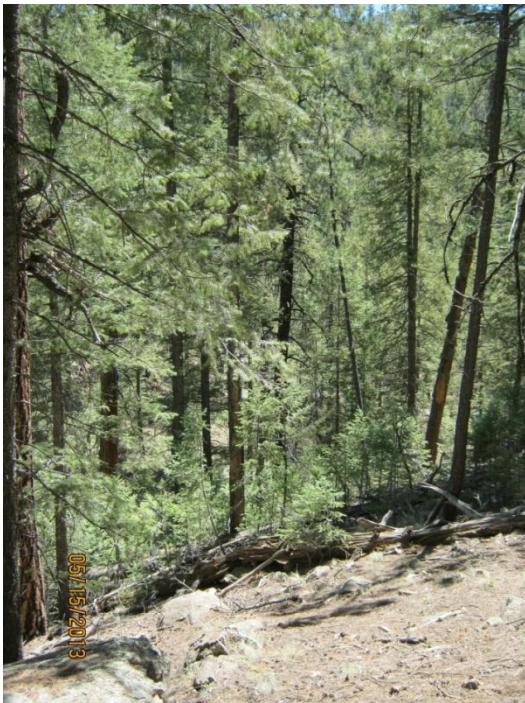


Figure 4: There are areas with heavy dead and down fuels

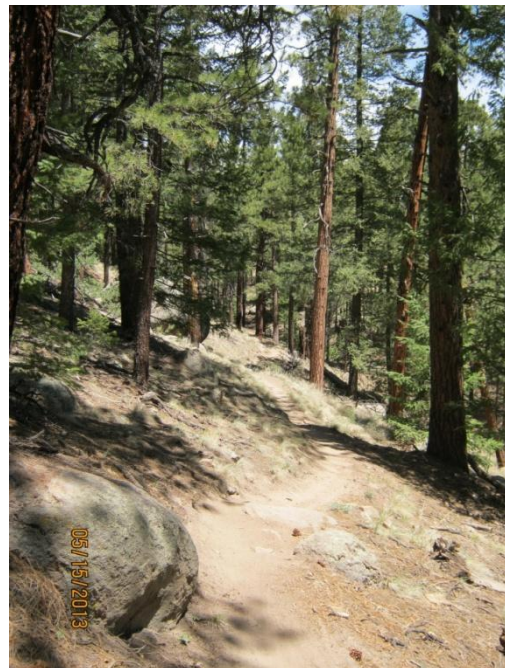


Figure 5: The Arizona Trail runs through an old growth stand and is adjacent to both demonstration units.

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Northern Unit



Figure 6: The northern demo unit is mostly Ponderosa Pine.

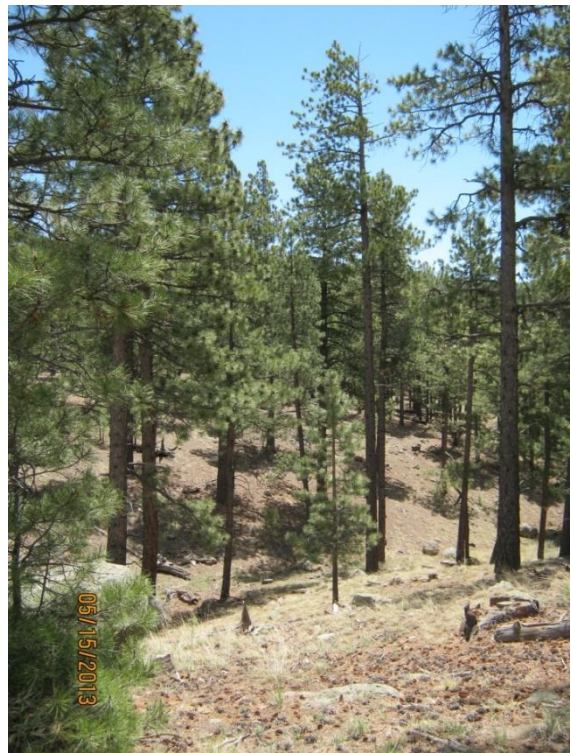


Figure 7: Some areas are relatively open and would be less intensely treated.



Figure 8: Here is a dense mature dog-hair thicket. This area is very dense despite being hand thinned about 30 years ago.

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TIMBER STAND PRESCRIPTION AND MARKING GUIDES

Goshawk Post-Fledging Family Areas (FA)

Ponderosa Pine Forest Types

Rx Prepared by: A. Stevenson

DATE: 05/2013

Rx Certified Silviculturist: A. Stevenson

PROJECT: FWPP- Demo Units	CUT UNIT: DN	ACRES: 9
	COMPARTMENT: 000267	STAND(s): 0029, 0038
Boundary Mark: Double Orange band at eye level facing into the unit, and vertical stripe facing towards next boundary tree to indicate change in direction		
Leave Tree Mark: Unit will be leave tree marked by the FS.		

Silvicultural Treatment: Northern Goshawk Un-even Age Treatment: Group Selection with Intermediate Thinning.

Existing Conditions: : This is a ponderosa pine stand. Stand structure is a two-age and even-age, dominated by VSS 3 & 4 size classes. There are scattered yellow pines throughout the unit. There is a small pocket of mixed conifer in the south-west corner of the unit. Basal Areas range from 80 to 200, with an average of around 115. The stand is currently greatly above desired stocking levels. This unit is deficient in VSS 1, 2, 5, & 6. Dwarf mistletoe infection is relatively light and scattered throughout the unit.

Desired Condition: To create a structure that meets the Northern Goshawk guidelines for foraging areas. A patchwork of small clumps and groups interspersed throughout the stand. Leave trees will have the least amount of dwarf mistletoe infestation. Basal areas (BA) within VSS 3 groups will range from 20 to 60 sq. ft. and average 40 BA, within VSS 4 groups BA will range from 30 to 90 and average 50 BA. Clumps of leave trees will have interlocking crowns where possible.

TREATMENT OBJECTIVES:

- Create an uneven-aged groupy stand structure.
- Improve residual tree growth, health, and vigor-with reduced density to desired stocking levels
- Reduce overall level of dwarf mistletoe infection

Marking Guide: Mark all species of trees greater than 1" dbh

- Vary group size from 2-44 trees up and from .05 to .7 acres in size
- In VSS 3 groups vary basal areas from 20 to 70 sq. ft. with an average of 40 sq. ft.
- In VSS 4 groups vary basal areas from 30 to 90 sq. ft. with an average of 50 sq. ft.
- Leave mostly desirable and acceptable trees as described in table 1
- Trees should be arranged in groups/clumps with interlocking crowns where possible
- Leave all Yellow Pines and trees greater than 24" dbh.
- Leave up to two wildlife trees per acre greater than 16" dbh where existing snags are less than 2 per/acre.
- All trees within identified Archeological sites will be left
- Implement a directional mark for one chain from the Arizona trail
- In areas where mature Douglas-firs are present, retain some health young and mid-aged DF.
- Where mature DF are not present, favor PP over young and mid-aged DF
- Leave any Limber Pine and White fir with dominate or co-dominate crown positions.

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- Remove most of DF, LP, and WF under story in areas dominated by Ponderosa Pine.
- Leave small groups of healthy PP and mixed conifer regeneration where present

Regeneration Openings:

- Provide for the creation of 20% openings across the stand (1.8 acres for this unit)
- Create opening in areas of denser VSS 3/4 pole stands.
- Openings will vary in shape and size from ½-1 acres, create two openings
- Openings should have a maximum width of 200 feet

Slash Treatment:

- Trees will not be removed from the unit
- Trees and slash will be piled or windrowed within the unit
- Piles and windrows will be placed in-between groups of trees
- Do not place piles and windrows beneath the crowns of any leave trees
- Avoid placing piles and windrows on large old logs or stumps

Discussion:

This treatment follows the standard and guidelines for managing habitat for Northern Goshawk as written in the Coconino Forest Plan and the Jack Smith Schultz Environmental Analysis. In areas of VSS 4/5/6 a minimum canopy cover of 40% will be left which is approximately an average of 50BA. In VSS 2/3 canopy cover will be more open to develop healthy tree growth and development. Current stand condition is two story and even age. There are a few open areas in the unit. Opening will be created across 20% of the unit. The remaining 80% of the stand will receive an intermediate thinning, with leave trees left in a groupy clumpy distribution. Maintain the current ratio of PP to DF where mature DF exist. Where there are no mature DF, remove most of the DF encroachment into the predominately pine areas. WF and LP are not common in this unit and can be retained if they have achieved a dominate or co-dominate crown positions.

Trees will be left in groups. There is no set spacing in-between groups. This means: **‘No Interspaces’**. A minimum of 20 BA must be maintained in-between all groups. Group sizes will range from .05 to .7 acres in size. The tree arrangement in this stand is already groupy. An occasional tree may be left in-between groups in order to maintain basal area coverage.

In some groups there may not be enough trees in the dominate size class to reach the targeted stocking level. Leave additional desirable or acceptable trees from smaller size classes to increase stocking. Desirable trees of the dominate VSS class will always be left first, then select the desirable trees of then next VSS size class down or acceptable trees from the larger VSS size classes. Only rarely would an unacceptable tree be left; typical reasons would be for the creation of a future wildlife tree or the removal of the tree would cause unacceptable damage to a leave tree.

Key in on creating groups where any VSS 5 and 6 trees occur.

The Coconino Forest Plan calls for maintaining 2 snags per acre. In areas which are deficit of existing snags up to 2 “wildlife” trees greater than 16” dbh may be left in addition to existing stocking. Wildlife trees include lightning struck trees, dead tops, and trees which are fading and may die soon. Mark trees with a “W”.

It is appropriate to leave the occasional intermediate or suppressed tree in well-formed groups in order to preserve the group and vertical canopy structure.

Where there is desirable and acceptable VSS 2 trees, leave the best dominate and co-dominate trees varying spacing from 8 to 15 feet apart. Allow for existing VSS2 DF in and adjacent to area that has existing mature DF.

This unit may contain archeological sites. No trees are to be mechanically removed from identified sites. Sites are marked with a single white band.

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No slash and trees will be removed. All slash and trees will be piled or windrowed and burned on site. The operator shall strive to place slash in locations which will minimize damage to residual trees when those piles are burned.

This unit will require an initial entry prescribed burn and future maintenance burns. The burns are important for recycling nutrients and maintaining healthy grass/forb communities as well as to reduce surface fuels. Future treatments should concentrate on maintaining a mosaic of openings and tree groups of varying ages and densities, as well as a healthy grass understory. One of the main objectives will continue to be the reduction of fire risk.

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PROJECT: FWPP- Demo Units	CUT UNIT: DS	ACRES: 8
	COMPARTMENT: 000267	STAND(s): 0037
Boundary Mark: Double Orange band at eye level facing into the unit, and vertical stripe facing towards next boundary tree to indicate change in direction		
Leave Tree Mark: Unit will be leave tree marked by the FS.		

Silvicultural Treatment: Northern Goshawk Un-even Age Treatment: Group Selection with Intermediate Thinning.

Existing Conditions: This is a mixed conifer and ponderosa pine stand. Stand structure is a uneven-age. Mixed conifer is predominately on the east facing slope and Ponderosa Pine predominately on the west facing slopes. This unit has not been harvested in the past. Basal Areas range from 60 to 140, with an average of around 95. While the basal area is not very high, there are a high number of trees per acre. The stand is currently greatly above desired stocking levels. There is dwarf mistletoe infection throughout the unit in the ponderosa pine.

Desired Condition: To create a structure that meets the Northern Goshawk guidelines for foraging areas. A patchwork of small clumps and groups interspersed throughout the stand. Leave trees will have the least amount of dwarf mistletoe infestation. Basal areas (BA) within VSS 3 groups will range from 20 to 60 sq. ft. and average 40 BA, within VSS 4 groups BA will range from 30 to 90 and average 50 BA. Clumps of leave trees will have interlocking crowns where possible.

TREATMENT OBJECTIVES:

- Create an uneven-aged groupy stand structure.
- Improve residual tree growth, health, and vigor-with reduced density to desired stocking levels
- Reduce overall level of dwarf mistletoe infection

Marking Guide: Mark all species of trees greater than 1" dbh

- Vary group size from 2-44 trees up and from .05 to .7 acres in size
- In VSS 3 groups vary basal areas from 20 to 70 sq. ft. with an average of 40 sq. ft.
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- Leave mostly desirable and acceptable trees as described in table 1.
- Trees should be arranged in groups/clumps with interlocking crowns where possible
- Leave all Yellow Pines and trees greater than 24" dbh.
- Leave up to two wildlife trees per acre greater than 16" dbh where existing snags are less than 2 per/acre.
- All trees within identified Archeological sites will be left
- Implement a directional mark for one chain from the Arizona trail
- In areas where mature Douglas-firs are present, retain some health young and mid-aged DF.
- Where mature DF are not present, favor PP (not infected with dwarf mistletoe) over young and mid-aged DF
- Leave any Limber Pine and White fir with dominate or co-dominate crown positions.
- Remove most of DF, LP, and WF under story in areas dominated by Ponderosa Pine.
- Leave small groups of healthy PP and mixed conifer regeneration where present
- Leave DF in favor of PP infected with dwarf mistletoe
- Maintain any mixed conifer species regeneration in areas where the PP overstory is infected with dwarf mistletoe.

Regeneration Openings:

- Provide for the creation of 20% openings across the stand (1.8 acres for this unit)
- Create opening in areas of denser VSS 3/4 pole stands.

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- Openings will vary in shape and size from ½-1 acres, create two openings
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Discussion:

This treatment follows the standard and guidelines for managing habitat for Northern Goshawk as written in the Coconino Forest Plan and the Jack Smith Schultz Environmental Analysis. In areas of VSS 4/5/6 a minimum canopy cover of 40% will be left which is approximately an average of 50BA. In VSS 2/3 canopy cover will be more open to develop healthy tree growth and development. Current stand condition is two story and even age. There are a few open areas in the unit. Opening will be created across 20% of the unit. The remaining 80% of the stand will receive an intermediate thinning, with leave trees left in a groupy clumpy distribution. Maintain the current ratio of PP to DF where mature DF exist. Where there are no mature DF, remove most of the DF encroachment into the predominately pine areas. WF and LP are not common in this unit and can be retained if they have achieved a dominate or co-dominate crown positions.

Trees will be left in groups. There is no set spacing in-between groups. This means: **‘No Interspaces’**. A minimum of 20 BA must be maintained in-between all groups. Group sizes will range from .05 to .7 acres in size. The tree arrangement in this stand is already groupy. An occasional tree may be left in-between groups in order to maintain basal area coverage. Mixed species groups are fine. Uneven-aged groups are fine too. An uneven-aged group doesn't mean leaving intermediate or suppressed trees in the group.

In some groups there may not be enough trees in the dominate size class to reach the targeted stocking level. Leave additional desirable or acceptable trees from smaller size classes to increase stocking. Desirable trees of the dominate VSS class will always be left first, then select the desirable trees of then next VSS size class down or acceptable trees from the larger VSS size classes. Only rarely would an unacceptable tree be left; typical reasons would be for the creation of a future wildlife tree or the removal of the tree would cause unacceptable damage to a leave tree.

Key in on creating groups where any VSS 5 and 6 trees occur.

The Coconino Forest Plan calls for maintaining 2 snags per acre. In areas which are deficit of existing snags up to 2 “wildlife” trees greater than 16” dbh maybe left in addition to existing stocking. Wildlife trees include lightning struck trees, dead tops, and trees which are fading and may die soon. Mark trees with a “W”.

It is appropriate to leave the occasional intermediate or suppressed tree in well-formed groups in order to preserve the group and vertical canopy structure.

Where there is desirable and acceptable VSS 2 trees, leave the best dominate and co-dominate trees varying spacing from 8 to 15 feet apart. Allow for existing VSS2 DF in and adjacent to area that has existing mature DF.

This unit may contain archeological sites. No trees are to be mechanically removed from identified sites. Sites are marked with a single white band.

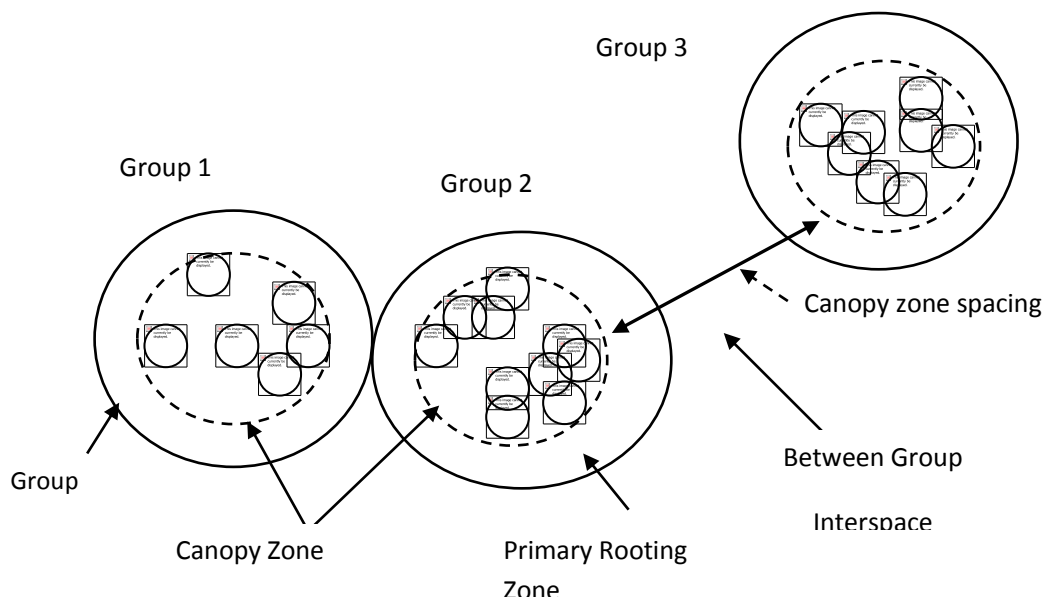
No slash and trees will be removed. All slash and trees will be piled or windrowed and burned on site. The operator shall strive to place slash in locations which will minimize damage to residual trees when those piles are burned.

This unit will require an initial entry prescribed burn and future maintenance burns. The burns are important for recycling nutrients and maintaining healthy grass/forb communities as well as to reduce surface fuels. Future treatments should concentrate on maintaining a mosaic of openings and tree groups of varying ages and densities, as well as a healthy grass understory. One of the main objectives will continue to be the reduction of fire risk.

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OTHER SILVICULTURAL TREATMENTS DURING THIS CUTTING CYCLE	
Pre-commercial Thinning	Where there is desirable and acceptable VSS 2 trees, leave the best dominate and co-dominate trees varying spacing from 8 to 15 feet apart. .
Site Preparation	Logging scarification and broadcast burning.
Planting	None
Burning	Burn piles post timber harvest. Follow-up with broadcast burn to stimulate nutrient cycling, fuels reduction, and reduce sapling thickets and overall density. Maintenance Broadcast burn natural fuels within 10 years.

Figure 1: DESCRIPTION OF GROUPS/ CLUMPS:



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1. Groups/ clumps are considered synonymous. Clumps are generally smaller than 1/10 acre in size.
2. Groups are composed of 2 zones:
Canopy Zone – the area of the group occupied by trees (within driplines). This is the basis of measurement for stocking guides, canopy cover and group area (ie: 1/10 acre).

Primary Rooting Zone – the critical area of the group necessary for tree root development. This is defined as an open strip adjacent to the tree canopy zone, and it measures in width approximately ½ of the radius of the canopy zone.
3. Between Group Interspaces – are openings in the forest that occur between groups. If these are specified, they are ***in addition to*** the rooting zone portion of the group. When these interspaces are specified, the overall per acre stocking targets are adjusted accordingly.

TABLE 2: PHYSICAL CHARACTERISTICS TO CONSIDER WHEN CHOOSING LEAVE TREES

	Leave trees must meet the desirable/acceptable physical characteristics, with priority give to trees possessing desirable characteristics. These trees will be the ‘pool’ from which to choose. Note that not ALL trees with desirable or acceptable characteristics will be leave trees. That decision depends on the leave tree selection process described in the marking guide and discussion. As practicable, never leave trees which possess any of the unacceptable characteristics.		
EVALUATION CRITERIA	DESIRABLE	ACCEPTABLE	NON- DESIRABLE
LIVE CROWN RATIO	>40% for ponderosa pine	25% TO 40% for ponderosa pine 35 to 50% for other species	Less than 25% for ponderosa pine Less than 35% for other spp.
CROWN CLASS	dominants and co-dominants	intermediates	suppressed & over-topped
DAMAGING AGENTS*: INSECTS, ANIMAL, FIRE, MISC. DISEASE	NONE	Minor insect or animal defoliation (< 25 % live crown ratio). Barking of ponderosa pine or Douglas-fir < 50 % of bole circumference. Fire kill of cambium < 50 % of bole circumference or the scorch is on the	Any bark beetle attacks. Defoliation >25% of live crown. Barking of ponderosa pine or Douglas-fir > 50 % of bole circumference. Any significant barking of other species.

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		lower 2/3 of the crown.	Any significant top killing. Fire kill of cambium >50 % of bole circumference, or the scorch reaches into the upper 1/3 of the crown. Any conks on stem which indicate rot.
(Hawksworth Dwarf mistletoe rating--DMR)	NONE	Infected pines with DMR rating from 1 to 3.	Infected pines with DMR rating 4-6 or any immediately adjacent trees to the infected ones.
FORM DEFECTS*	NONE	MINOR (no significant weakening of the tree anticipated. Minor crooks, sweeps, and tight forks which are < 30% of total tree height are acceptable if the tree is dominant or co-dominant and otherwise has good vigor).	MAJOR (weakening of tree or multiple tops)
SOUNDNESS DEFECTS*	NONE	NONE	ANY
RESERVE TREES	See snag requirements in wildlife section See legacy tree discussion		
<p>* Live trees with broken tops, defects, etc. may be marked with a “W” as leave trees for potential snag recruitment where existing snags are less than 2/acre. However, these should not be counted towards the number of leave trees needed to form the VSS group.</p>			

